REMARKS

Applicants' counsel thanks Examiner Vo for her continued careful examination of the present application. New claim 33 has been added to claim the additional feature that the protective layer of claim 1 includes a hard outer shell disposed adjacent the "skin" opposite the foam substrate. No new matter has been entered; basis for this new claim can be found in the application as-filed, e.g. in the drawing figures.

All of the prior art-based rejections have been withdrawn in favor of new rejections based on newly-cited WO 91/05489 as a primary reference.

Specifically, all the claims now stand rejected under 35 USC § 103(a) as being obvious over WO 91/05489 (hereafter WO'489) in view of Moore and FR 2 717 659 (hereafter FR'659). The rejections are respectfully traversed.

Referring to claim 1, the invention claimed is a protective layer comprising a viscoelastic foam substrate that has a flexible skin. The skin has a protective zone with a plurality of vent holes. Except for the vent holes, the skin is a barrier to exhaustion of gas from the foam substrate on compression thereof. The local rigidity (i.e. the effective rigidity that is observed) in the region of the protective zone is influenced by the number and size of vent holes in that zone.

Such a foam substrate with the skin as claimed can be provided as an energy-absorbing liner within a helmet shell. Referring to Fig. 15 of WO'489 (cited by the Examiner), such a foam substrate could be used, for example, as the liner 142 beneath the resilient outer shell 144. But the shell 144 itself, even assuming it is flexible – which it is not as will be explained, cannot assist to control the local rigidity of the liner 142 by arranging openings therein. First, even assuming the openings in the shell 144 were appropriately dimensioned to provide that effect (which they are not), that shell will not contact the liner with sufficient face-to-face intimacy so that compressed air would exit only through such openings in the shell, instead of laterally through the space in between the liner and the shell. Without some barrier to air exhaustion through that space (which is not disclosed in WO'489 and in any event would be impractical and prone to failure), air that is expelled from the liner 142 on compression will take the least resistant path of escape, which will not be *through* the shell 144 as would be necessary if openings in the shell 144 were to regulated local rigidity of the liner.

Second, contrary to claim 1 and the Examiner's assertions, the shell 144 *is not flexible*. The Examiner herself has cited the passage that evidences this fact: "the liner is retained in the helmet by the resilient action of the shell which holds it captive therein." Page 6, lines 15-17. A shell 144 capable to captively and resiliently hold the liner 142 therein, especially when it does not completely enclose the liner 142 (*see* Fig. 15), *cannot* be a flexible skin as claimed. A flexible skin exhibits no such resiliency capable to "*captively*" retain the liner therein. A flexible skin is compliant and able to follow the contour of the liner (or viscoelastic foam substrate in claim 1) through compression and rebound. Such a flexible skin will not exhibit the necessary resiliency to "captively" retain the liner 142 as described in WO'489 and kindly noted by the Examiner. Nor can it be considered obvious to modify that shell to make it flexible. For that would destroy the essential utility of the shell 144 in WO'489, making it unable to resiliently and captively retain the liner 142.

Third, as in prior rejections that cited large ventilation openings in a helmet *shell*, the large ventilation openings in the shell in WO'489 do not function to regulate local rigidity in the underlying foam layer. The purpose of large ventilation openings through the helmet shell is to permit air circulation between the wearer's head and the helmet while it is being worn. This increases comfort and encourages sports participants to leave their helmets on.

> The shell 144 includes openings 172 in the ribs 166, 168 and 170 near the rear thereof and openings 173 near the front thereof. Similar openings are also formed in the ribs at the front of the cover. In use of the helmet a stream of air can enter the openings 173 at the front of the cover and travel into the longitudinal passages formed by the grooves 67 as indicated by arrows 175 in Figure 15 and exit via the openings 173 at the rear of the helmet. Secondary air streams 177 from the interior of the helmet are drawn by venture effect through the holes 164 to join the stream 175. This provides additional ventilation for the helmet in addition to that provided by the other openings of the helmet which have been described previously.

WO'489, p. 11 line 26 to p. 12 line 3.

To achieve the necessary ventilation, the openings in the outer shell are very large and either coincide or cooperate with associated openings through the foam liner

itself to permit mass air flow. *See* the passage quoted above in conjunction with Fig. 15 of WO'489. The openings in the shell are so large that even if the shell were somehow appropriately sealed to the liner so that air escaping from the liner must go through the shell, the air will escape instantly through the very large ventilation openings in the shell. Such instantaneous escape will provide no effect on the observed rigidity of the foam liner at all. In other words, the large mass-air-flow ventilation openings would be totally ineffective to influence the local effective rigidity of the underlying liner, even if air displaced from the liner on compression *must* exit through the shell.

In addition to Fig. 15, the very large openings through the shell to permit bulk mass-air-flow can be seen in Fig. 12, of which Fig. 15 is a lateral cross-section. Simply stated, despite the fact that it may have mass-air-flow ventilation openings, such an outer shell absolutely will not limit or influence the effective rigidity of the underlying liner based on any contribution of those openings. Moreover, such a helmet shell is not the "skin" as claimed; a foam layer *having the claimed skin* would be adapted to be housed *within* such a shell. It would not *be* the shell. To even more clearly distinguish the "skin" as claimed from an outer helmet shell, new claim 33 has been added depending from claim 1, in which the protective layer of claim 1 further includes a hard outer shell disposed adjacent the "skin" opposite the foam substrate. Accordingly, it should now be very apparent that the "skin" that is claimed is not the same as and does not read on a rigid or hard outer shell, which may be included separately from the skin, as in a helmet.

What is claimed, and submitted herein to be novel, is a skin overlying a foam layer wherein the skin has a plurality of openings in a protective zone of the foam layer so that air expelled from the foam layer on compression will be forced through the openings in the skin, and ***wherein those openings are effective based on their number and size to influence the apparent or observed rigidity of the liner at that location***. Quite clearly, a helmet outer shell having mass-air-flow ventilation openings will not have this effect. Nor will this effect be observed based upon *any* outer helmet shell having large air ventilation openings to which a foam liner is to be simply laminated or glued or attached by Velcro or "captively" retained. However, new claim 33 has been added as explained above to even more clearly distinguish such outer helmet shells from the "skin" as claimed.

The Examiner has acknowledged that WO'489 does not disclose influencing the effective foam rigidity based on holes in a foam liner's skin, and has relied on FR'659 to modify WO'489 to provide that feature. However, for the same reasons as above, FR'659 does not disclose that feature and cannot be combined with WO'489 to suggest it. First, WO'489 cannot be so modified in an obvious way for reasons already explained. That is, the rigid shell in WO'489 is not a "flexible skin" as claimed, and cannot be made such lest its utility be destroyed. Second, FR'659 *also* discloses a rigid outer shell. See the enclosed English-language abstract of FR'659, wherein the helmet "has a shell (1), made in hard moulded plastic material...." Third, the holes 8, 7 and 14 are provided and effective to demist the visor (4) and ventilate the helmet interior based on a mass-flow of ventilation air entering the hole 5 while the wearer is in motion. The relative sizes of the holes 8, 7 and 14 are designed to ensure ventilation of the back of the head to remove moisture from the wearer's hair so that it does not become sweat-soaked during use of the helmet. This is evident from the enclosed Google translation of the original French document. Although it is a machine translation, it does make clear that the purpose and function of those holes is ventilation to keep the wearer's hair dry; ***not to influence the local rigidity of the underlying polyurethane foam layer***. No such effect is disclosed anywhere in FR'659, nor is it apparent. In fact, from Fig. 2 of FR'659 it is clear that such an effect cannot be obtained, as the holes 7, 8 and 14 are drilled completely through the foam and therefore do not satisfy the limitation from claim 1 that, "said vent holes provid[e] fluid communication between the ambient environment and a portion of the *surface of said foam substrate that underlies said protective zone*." Because the vent holes in FR'659 are drilled completely through the underlying foam substrate, there is no surface of that substrate underlying the hole in the shell (1), even if that shell might be considered a "skin" as claimed (which it is not).

There is also no basis from FR'659 for the Examiner's assertion that FR'659 has two protective zones wherein "the portion of the outer shell is more rigid adjacent the first zone than that adjacent the second zone." The rigidity of the *shell itself* will not change, there is no discussion of the holes in FR'659 being effective to provide the claimed effect on the observed rigidity of the foam substrate, the fact that they are provided and intended for mass-air-flow ventilation suggests they are too large to

provide that effect, it is not evident that the foam is sufficiently intimately bonded to the hard shell that air expelled from the foam on impact *must* exit through the shell and not laterally between the shell and the foam layer, and the holes are drilled completely through the foam. In summary, there is no suggestion from FR'659 to modify WO'489 to provide a skin having a protective zone with a plurality of openings overlying a surface of the foam, whose number and size are selected to regulate or affect the observed rigidity of the foam layer on compression. FR'659 does not even disclose a flexible skin having holes in it; rather it merely describes a rigid outer shell (1) having ventilation openings. For reasons already explained, a rigid outer shell with ventilation openings does not remotely suggest the novel structure embraced by claim 1 – a foam whose effective local rigidity is determined in part by the number and size of vent holes provided in the associated protective zone of the overlying skin. New claim 33 further distinguishes the "skin" in claim 1 from the rigid outer shell of a helmet which the Examiner has cited to refer to the claimed "skin." By specifying such a hard shell in a dependent claim, the "skin" recited in claim 1 is now clearly distinguished from such a shell, and is a separate element therefrom.

For the foregoing reasons the rejections of claim 1 (independent claim) and of all remaining claims, which depend from claim 1, have been overcome.

If any additional fees are required by this communication, which are not mentioned above, please charge the same to our Deposit Account No. 16-0820, Order No. 34563US1.

Respectfully submitted,

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